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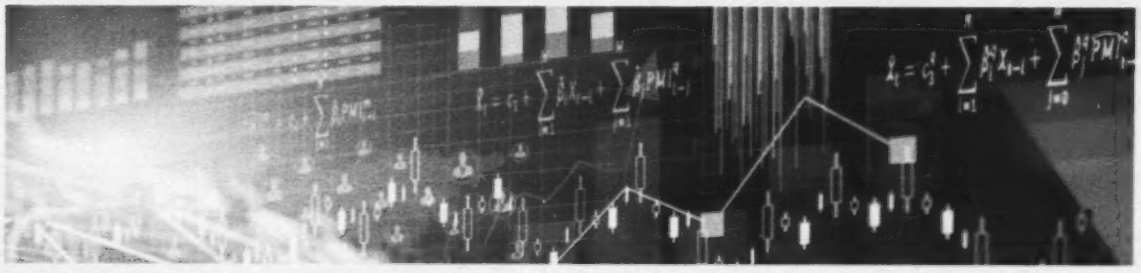
Bitcoin Awareness and Usage in Canada: An Update



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Abstract

This note provides an update of the results of the 2017 Bitcoin Omnibus Survey (BTCOS) conducted by the Bank of Canada from December 12 to 15, 2017. The BTCOS was previously conducted in November and December 2016 and the results were reported in Henry et al. (2017, forthcoming). The 2017 survey took place in an interesting time, as Bitcoin prices were increasing and reached an all-time high on December 17, 2017. During this period, the level of awareness of Bitcoin increased from 64 per cent in the 2016 BTCOS to 85 per cent in the 2017 BTCOS, while ownership rose from 2.9 to 5.0 per cent, respectively. The main reason cited by survey participants for owning Bitcoin changed from transactional purposes in 2016 to investment purposes in 2017. Further, only about half of Bitcoin owners were found to regularly use Bitcoin to buy goods or services or to send money to other people.

Bank topics: Bank notes; Digital currencies; Econometric and statistical methods
JEL codes: E4, C12

Résumé

Cette note analytique fait état des résultats de l'enquête-omnibus de 2017 sur le bitcoin (EOB) menée par la Banque du Canada du 12 au 15 décembre 2017. L'enquête EOB précédente s'est déroulée en novembre et en décembre 2016, et ses résultats sont présentés dans une étude de Henry et autres (2017, à paraître). L'enquête de 2017 a été réalisée dans un contexte particulier, à un moment où les prix du bitcoin se sont envolés pour atteindre un niveau record, le 17 décembre 2017. Durant cette période, 85 % des répondants ont dit avoir entendu parler du bitcoin (contre 64 % en 2016) et 5 % (2,9 % en 2016), en détenir. Selon les personnes interrogées, les bitcoins ne sont plus tant détenus pour des motifs transactionnels, comme c'était le cas dans l'enquête de 2016, que comme instrument de placement. En outre, seulement la moitié environ des détenteurs de bitcoins en utilisent régulièrement pour acquérir des biens ou des services ou pour transférer des fonds.

Sujets : Billets de banque; Monnaies numériques; Méthodes économétriques et statistiques
Codes JEL : E4, C12

1 Introduction

In 2017, the price of Bitcoin rose from about US$1,000 in early January to an all-time high of US$19,738.21 on December 17.[1] Despite the large run-up in prices, the daily volume of Bitcoin transactions increased by only 32 per cent during this period, from an average of about 280,000 transactions per day in January to 360,000 transactions per day in December (Figure 1).[2] Increasing prices resulted in a heightened interest in Bitcoin, as evidenced by Google Trends, where Bitcoin was ranked the second-most searched term in the "Global News" category.[3] The natural question that arises is whether Bitcoin is a currency or an investment vehicle. Many central banks and pundits offered warnings of Bitcoin, including Bank of Canada Governor Stephen S. Poloz, who offered the following cautionary advice:

> *"Actually, there is one more thing keeping me awake at night, which perhaps I should mention, and that is all the noise I keep hearing about cryptocurrencies, especially Bitcoin. There is a lot of hype around Bitcoin, and markets are evolving quickly to allow wider access, including to retail investors. So perhaps you will allow me to make a couple of points. To begin with basics, the term 'cryptocurrency' is a misnomer—'crypto,' yes, but 'currency,' no. For something to be considered a currency, it must act as a reliable store of value, and you should be able to spend it easily. These instruments possess neither of these characteristics, so they do not constitute 'money.'"*
>
> **Governor Stephen S. Poloz, December 14, 2017**[4]

To assist in monitoring developments in the adoption and usage of Bitcoin, the Bank of Canada conducted a survey called the Bitcoin Omnibus Survey (BTCOS) in late 2016; see Henry, Huynh and Nicholls (2017, forthcoming). We focus on Bitcoin as it is the most well-known private digital currency. Given the increased interest in Bitcoin in 2017, the BTCOS was repeated to understand whether adoption and usage had increased, and to identify the driving reasons for ownership during the sudden rise in Bitcoin prices. The Bank of Canada's interest in Bitcoin is to understand whether its adoption and usage by Canadians could affect the financial system. Further, it is important to understand Bitcoin's potential impact on how the Bank of Canada undertakes its core functions such as the production and distribution of currency.

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[1] https://www.coindesk.com/900-20000-bitcoins-historic-2017-price-run-revisited

[2] **Reaching an all-time high of 398,327 on December 15, 2017. Source:** https://www.blockchain.info/charts/n-transactions?timespan=2years

[3] **Additionally, in Canada "Bitcoin" was ranked number 4 in "International News" and "How to buy bitcoin in Canada" was ranked number 5 in the "How..." category. Source:** https://trends.google.com/trends/yis/2017/GLOBAL

[4] https://www.bankofcanada.ca/2017/12/three-things-keeping-me-awake-at-night/

Overall, results from the BTCOS show that awareness increased from 64 to 85 per cent while ownership increased from 2.9 to 5.0 per cent. Previously, the 2016 BTCOS found that most Canadians who owned Bitcoin did so for transactional purposes and because of an interest in new technology. However, in 2017 we found that investment was the number one reason. Further, only about half of Bitcoin owners were found to regularly use it to buy goods or services or to send money to other people.

The structure of this paper is as follows: Section 2 describes the 2017 Bitcoin Omnibus Survey. Section 3 discusses the awareness and usage of Bitcoin while Section 4 provides a profile of Bitcoin users in 2017. Finally, Section 5 offers a conclusion.

2 The 2017 Bitcoin Omnibus Survey

In late 2016, the Bank of Canada's Currency department commissioned a pilot study known as the Bitcoin Omnibus Survey. The survey was conducted in two waves: the first ran from November 9 to 13, 2016, and the second from December 14 to 18, 2016. With these two waves, we obtained a total sample size of $N = 1{,}997$, including 58 current Bitcoin owners.

The BTCOS was considered a pilot because we anticipated obtaining only a small sample of Bitcoin users. In light of this, the survey was kept short and concentrated on the key metrics of public awareness of Bitcoin, ownership and reasons for ownership, and Bitcoin holdings. A knowledge test was added in the second wave to objectively measure Bitcoin literacy among owners and non-owners who had heard of Bitcoin.

The first two waves provided valuable lessons learned and helped to improve future studies. Meanwhile, as described above, the price of Bitcoin grew exponentially over 2017; see Figure 1. Against this background, the Bank of Canada decided to conduct a third wave of the BTCOS, roughly one year after the first two waves. The aim of the new 2017 BTCOS was to measure how awareness and ownership had changed over time, and to use lessons learned from the first two waves to gain a deeper understanding of the motivation of Bitcoin adopters.

The third wave of the BTCOS was put into the field from December 12 to 15, 2017, right around the time that the price of Bitcoin had reached its peak. Core features from the first two waves of the survey were maintained and several new questions were added[5] (see Appendix A.1 for a full schematic of the updated survey). The purpose of the new questions was to measure the extent to which respondents were holding Bitcoin for transactional versus speculative purposes. Of particular relevance here, we asked owners directly about how often they use Bitcoin to transact, both for purchasing goods/services and for making person-to-person transfers.

[5]Note that many of the new questions are not discussed here as they are not analyzed in this paper.

The final sample size for the 2017 BTCOS was $N = 2{,}623$ and the sample was post-stratified by region, age and gender to match the population totals observed in the 2016 Canadian census. Methodology, including sampling, imputatation and post-stratification was conducted in the same manner as the 2016 BTCOS; see Henry, Huynh and Nicholls (2017) for full details.

3 Public awareness and knowledge of Bitcoin

3.1 Increased awareness of Bitcoin

Awareness of Bitcoin in the BTCOS is measured by the response to the question, "Have you heard of Bitcoin?". The level of awareness in the Canadian population rose 21 percentage points from 2016 to 2017, from 64 to 85 per cent. Increased awareness was observed across all demographic groups; see Table 1. In 2017, the highest levels of awareness were observed among residents of British Columbia (93 per cent), as well as among Canadians with an income of $70,000 and above (92 per cent).

In terms of changes over time, Quebec saw the largest increase in awareness, as it rose from 49 per cent in 2016 to 77 per cent in 2017. Awareness among women rose to 80 per cent in 2017, an increase of 26 percentage points. Awareness also increased across all age groups, from 62–68 per cent in 2016 to 83–89 per cent in 2017. In general, demographic trends in awareness remained consistent across years. For example, males were noticeably more aware than females (91 vs. 80 per cent in 2017; 75 vs. 54 per cent in 2016). Additionally, higher awareness was associated with higher education and income levels in both 2016 and 2017. From a geographic perspective, British Columbia had the highest levels of Bitcoin awareness in both years, whereas Quebec had the lowest.

3.2 Knowledge of Bitcoin in 2017

Updates to the knowledge questions in the BTCOS were made in 2017 to make the true/false statements more clear and objective, and to test the knowledge of the characteristics of Bitcoin and other digital currencies. In this section, we analyze results from the knowledge test and posit implications for awareness and ownership of Bitcoin in Canada. See Figure 2 for the changes to the knowledge questions,[6] and Table 2 for detailed results discussed

[6]Wording for both questions 2 and 3 were kept identical across the two years. Additional wording was added to question 1 to make it more clear which property of Bitcoin was being tested (no *trusted* third party). In contrast, question 4 was shortened considerably. Question 5 was replaced with a relatively more subjective question designed to test the respondent's understanding of the economic incentives underlying the security of the blockchain. Specifically, to say that the security relies *solely* on cryptography fails to acknowledge that the incentives align to preserve a *single* history of transactions.

below.

Two scores were calculated to measure objective knowledge of Bitcoin among both owners and non-owners in 2017: $score_1$ was the sum of all correct answers; $score_2$ was the sum of correct answers less the number of incorrect answers. The reason for deducting points is to penalize those survey respondents who guessed, while answering "Don't know" was not subject to a point deduction. The scores in both years were calculated using questions 1–4; the low scores by both Bitcoin owners and non-owners on question 5 suggest that the question was quite difficult to understand and may benefit from clarification, or may require a nuanced understanding of the Bitcoin system.

On average, both owners and non-owners scored higher on the knowledge test in 2017 compared with 2016. Owners answered 2.7 questions out of 4 correctly in 2017, whereas non-owners managed only 1.4. Further, $score_2$ was one point higher on average for owners (1.9) compared with non-owners (0.9).

For owners, it appears that the increase in the score across time was largely due to the improved clarity of the statements. The proportion answering the "government-backed" question correctly rose from 37 to 78 per cent, a dramatic improvement. The change in the wording for question 1 was also reflected in a nine percentage-point increase among owners. This suggests that we succeeded in improving the reliability of the test, under the assumption that owners should outperform non-owners on average.

For non-owners, the results suggest that not only were Canadians more aware of Bitcoin in 2017, but also objectively more informed. For the questions that were unchanged across years, non-owners were both more likely to attempt the questions in 2017 compared with 2016 (42 vs. 33 per cent for question 2; 35 vs. 29 per cent for question 3), and more likely to answer both of these questions correctly (19 vs. 13 percent; 16 vs. 14 percent). Non-owners were largely aware that Bitcoin is not backed by a government, as this question had the highest participation rate among non-owners (62 per cent attempted) and was also the best answered (59 per cent answered correctly).

The new version of question 5 in 2017, concerning the security of Bitcoin, was poorly answered both by owners (13 per cent correct) and non-owners (3 per cent correct). It was also the least attempted question among Bitcoin owners, at 80 per cent.

4 A profile of Bitcoin users in 2017

4.1 Increased ownership of Bitcoin

Increased awareness of Bitcoin was accompanied by a significant[7] increase in ownership, from 2.9 per cent in 2016 to 5.0 per cent in 2017. On the contrary, the difference in ownership rates among aware respondents between 2016 and 2017 was not significant, suggesting that much of the increase in ownership was driven by an entrance of newly aware consumers.

The increase in Bitcoin ownership was seen more in certain demographic groups (Table 1). The 18-to-24 age group, already one of the main users of Bitcoin in 2016, grew the most in ownership, from 6 to 14 per cent in 2017. Most other age groups saw increased ownership as well, but the differences were usually not significant. The exception was the 45-to-54 age group, where ownership grew almost four times over from 0.9 to 3.5 per cent.

The gender gap in Bitcoin ownership grew in 2017 compared with 2016. While ownership among women remained close to 2 per cent in 2017, ownership among men nearly doubled from 4.2 to 8.1 per cent. Ownership also grew in all provinces (significant only in the Prairies and Ontario) and among the college- and university-educated populations.

4.2 Bitcoin holdings

The amount of Bitcoin held by users in 2016 and 2017 is shown in Figure 3. In this condensed grouping, there are no significant differences in the distributions year-over-year. That being said, there is some evidence of an increase in the proportion of owners with small amounts of Bitcoin: in 2016, 32 per cent of Bitcoin owners stated they held less than 0.1 BTC ($100 CDN[8]) while a similar percentage (34 per cent) stated they had less than 0.05 BTC ($1,050 CDN) in 2017. This is consistent with at least two (reinforcing) possibilities: new Bitcoin users observed in 2017 could predominantly have bought small amounts of Bitcoin; and existing users could have sold off much of their Bitcoin. Both of these possibilities could be driven by the skyrocketing prices of late 2017.

As it currently stands, the bins in which Bitcoin holdings are measured are too wide to compute reliable estimates of mean, median or total Bitcoin owned by Canadians. However, as a validation exercise, using survey weights and approximations we are able to compute an upward bound of total Bitcoin holdings in Canada. We find that this approximation

[7] For this and following sections, differences are deemed statistically significant if the p-value from a non-paired, unequal variance t-test falls below the threshold of 0.05, i.e., a 95 per cent significance level. Detailed results may be provided upon request. Here "significance" and "statistical significance" are used interchangeably.

[8] We use the following exchange rates: 1 BTC = $1,000 CDN for waves 1 and 2 of the BTCOS (November and December 2016), and 1 BTC = $21,000 CDN for wave 3 of the BTCOS (December 2017). These are roughly based on data from www.cbix.ca, but are not perfect given the volatility of Bitcoin prices.

yields that Canadians account for 6 and 11 per cent of total Bitcoin holdings in 2016 and 2017, respectively. It is difficult to verify this finding due to a lack of data. One possible way is to calculate the Canadian share of all Bitcoin trading volume on exchanges. For example, on December 31, 2017 Canadians accounted for about 0.28 per cent of Bitcoin trading volume,[9] suggesting we overestimate Canadian holdings. A natural reason for this may be due to exaggeration of mostly young and male respondents. Appendix A.2 contains an extensive discussion of this result and provides a rationale for it. Future BTCOS surveys will experiment with finer grids or self-reported continuous value and volume of Bitcoin holdings.

4.3 Why do people own Bitcoin?

An important question in studying Bitcoin and other digital currencies is why people own Bitcoin. The answer to this has implications for central banks as issuers of cash and as they research the costs and benefits of central-bank-issued digital currencies (see, e.g. Engert and Fung (2017)). The 2017 BTCOS aimed to delve a bit deeper into this question by asking how often owners used their Bitcoin for two purposes: to pay for goods and services and to send money to other people. For this section, we make the distinction between *transactors*—those who used Bitcoin for one of these purposes at least once per year—and *non-transactors*—those who used Bitcoin at most "once or twice, but not on a regular basis." Bitcoin owners were split roughly evenly between the two groups, with transactors and non-transactors each making up about half the population.

If half of Bitcoin owners do not use it to transact, there must be other reasons to hold it. To investigate this, the BTCOS asked Bitcoin owners to choose their *main* reason for owning it from a predetermined list (Table 3a). In 2017, the driving motivation for Bitcoin owners was to hold it "as an investment," with 58 per cent of owners choosing this response. In second place was "My friends own Bitcoin" at 12 per cent, and the other response options were all below 10 per cent. These reasons provide an explanation for the large number of non-transactors, who overwhelmingly held Bitcoin as an investment (77 per cent) compared with transactors (38 per cent). Unsurprisingly, Bitcoin transactors stated that they own it to buy goods/services on the Internet (12 per cent), but also because their friends own it (11 per cent) and it is a cost-saving technology (11 per cent). Therefore, a minority of respondents are using Bitcoin for transactions.

These figures reflect a substantial shift from the motivations of Bitcoin owners in late

[9]Source: `data.bitcoinity.org`. Note that it is unclear to what extent this corresponds to holdings shares, as not all trading activity occurs on exchanges. Further, owning and trading are different concepts; if, for example, trading activity grows exponentially as a function of total Bitcoin owned, the holdings of larger countries would be overestimated using trading shares while smaller countries would be underestimated.

2016. Table 3b collapses the reasons from Table 3a into relevant categories. In 2016, the plurality (39 per cent) of owners gave payment-related reasons as their primary motivation for ownership, with technology-related reasons close behind (36 per cent). By contrast, only 12 per cent of owners stated they held it as an investment. In 2017, however, the combined payment-related reasons were cited by only 10 per cent of Bitcoin owners. This finding provides some empirical support for the conclusion of Bolt and van Oordt (2016) that most of the fluctuations of the Bitcoin price is due to speculation.

5 Conclusions

The Bank of Canada undertook another Bitcoin Omnibus Survey during the height of the rise of the Bitcoin price in December 2017. Despite the large price increase, the adoption rate increased from 2.9 to only 5.0 per cent from 2016 to 2017. Self-reported holdings of Bitcoin among users did not remarkably change during this period. However, the number one reason for holding Bitcoin did change from transactional (39 to 10 per cent) to investment purposes (12 to 58 per cent). The BTCOS serves as a useful monitoring tool to understand the developments of the diffusion of Bitcoin. Future research may consider other cryptocurrencies and financial technologies.

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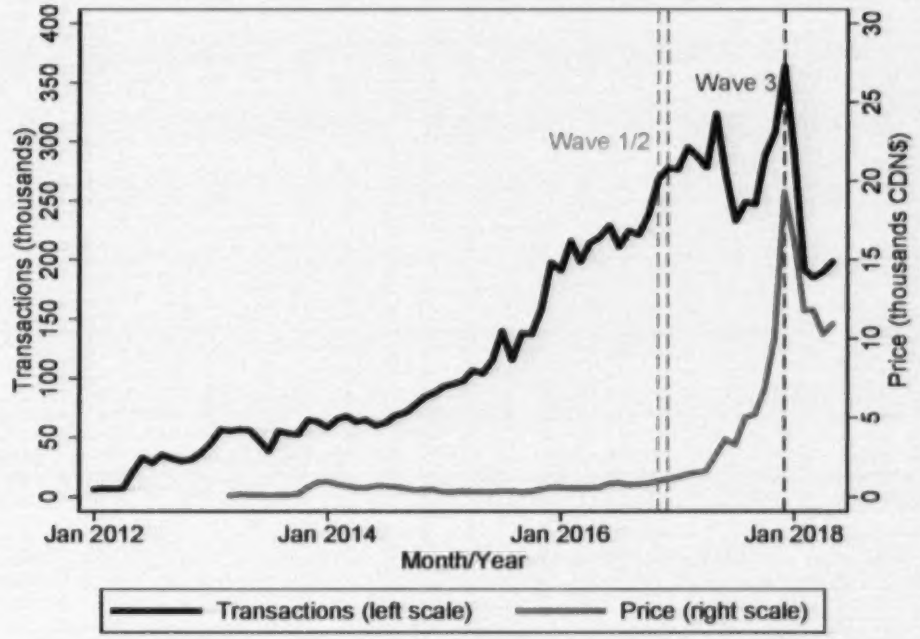
Figure 1: **Price and number of Bitcoin transactions, 2012–18 (monthly average)**



Note: This graph shows the price of Bitcoin in Canadian dollars and the number of daily transactions made with Bitcoin, averaged over each month from January 2012 to May 2018. Note that the data series for price starts at March 12, 2013. The red vertical lines show when the first two waves of the BTCOS were in the field; the blue vertical line shows when the third wave was in the field. Source: bitcoin.com (transactions) and ca.finance.yahoo.com (prices).

Figure 2: **Bitcoin knowledge questions**

1a) Bitcoin allows for direct transactions between two parties, without a third party involved. [TRUE]

1b) Bitcoin allows for direct transactions between two parties, without the need for a trusted third party involved. [TRUE]

2) The total supply of Bitcoin is fixed. [TRUE]

3) All Bitcoin transactions are recorded on a distributed ledger that is publicly accessible. [TRUE]

4a) Bitcoin is similar to other national currencies, such as the Euro or Peso, that are backed by a government. [FALSE]

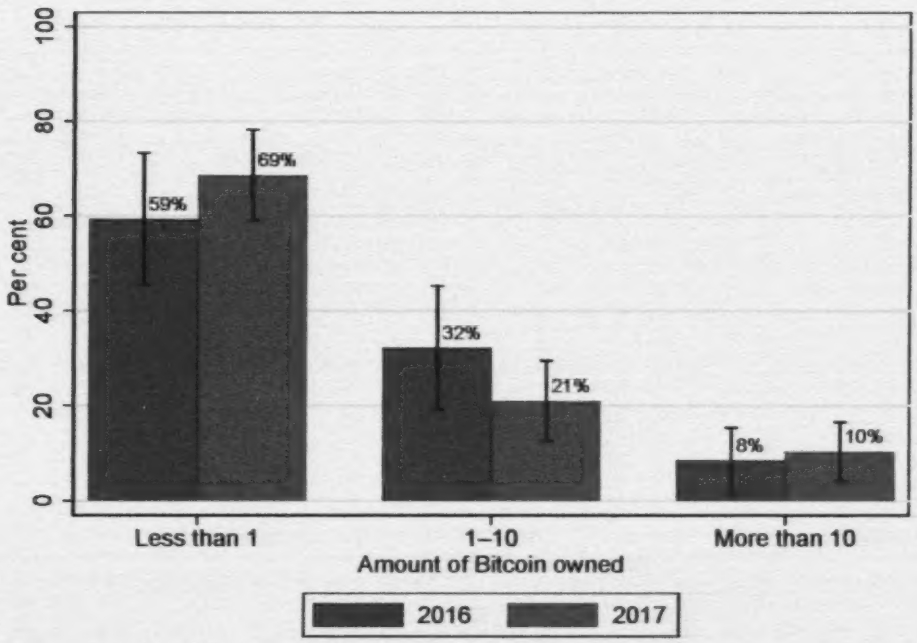
4b) Bitcoin is backed by a government. [FALSE]

5a) Bitcoin transations take place instantaneously. [FALSE]

5b) The security (i.e. immutability) of the Bitcoin system relies solely on cryptography. [FALSE]

Note: This figure shows the knowledge questions implemented in Wave 2 (2016) and Wave 3 (2017) of the BTCOS. The 'a' versions are from Wave 2 and the 'b' versions are from Wave 3. Questions 2 and 3 remained unchanged across the two iterations. The order of the features was randomized when presented to each respondent.

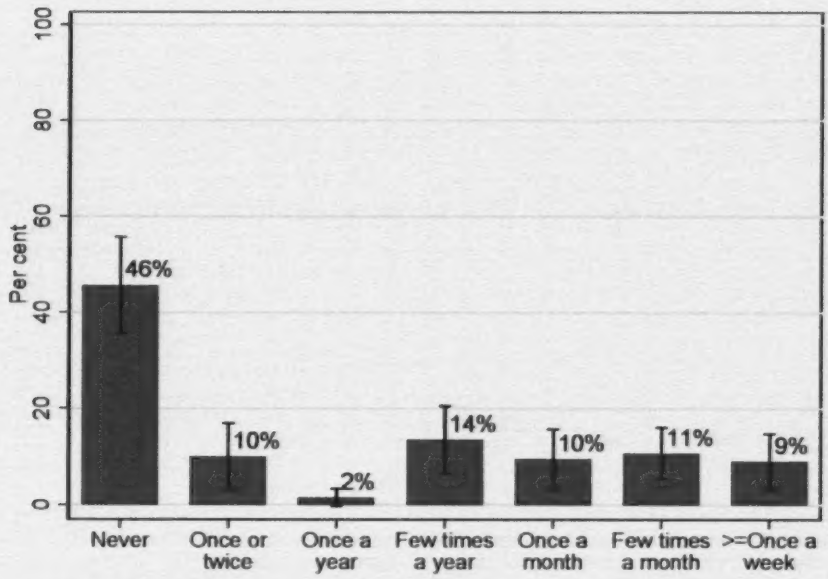
Figure 3: **Bitcoin holdings, 2016 vs. 2017**



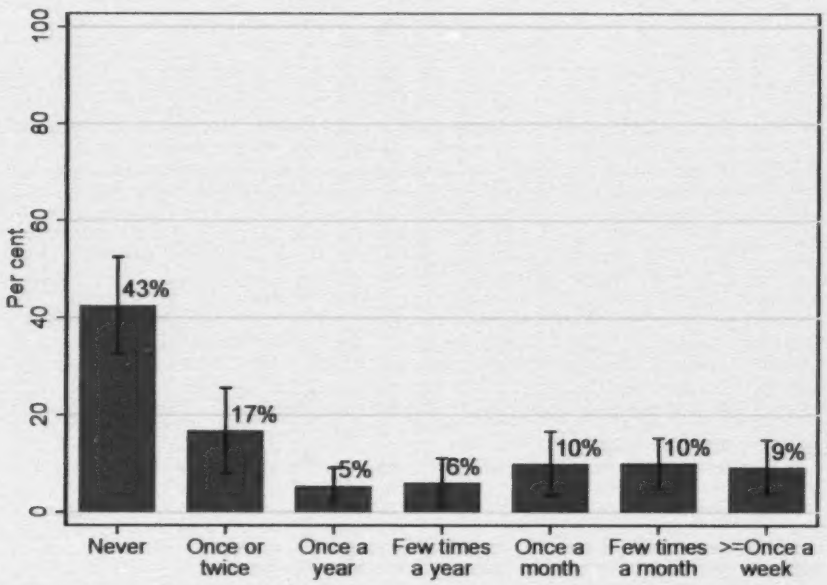
Note: This graph shows the percentage of Bitcoin owners holding different ranges of Bitcoin in 2016 and 2017. In 2017, we increased the number of bins that respondents could select. However, to make a comparison across years, the number of bins was collapsed to three.

Figure 4: **Use of Bitcoin**

(a) **Buying goods/services**



(b) **Making person-to-person transfers**



Note: These graphs show the level of usage of Bitcoin among owners for making different types of transactions.

Table 1: **Awareness and ownership of Bitcoin in Canada**

	Awareness		Ownership	
	2016	2017	2016	2017
Overall	64	85	2.9	5.0
Gender				
Male	75	91	4.2	8.1
Female	54	80	1.8	2.2
Age				
18–34	68	89	7.6	12.7
35–54	62	85	1.9	3.8
55+	63	83	0.6	0.7
Education				
High school	53	78	4.0	3.9
College	63	84	1.9	4.1
University	72	90	3.3	6.4
Income				
<30k	50	74	3.8	4.5
30k–69k	59	85	2.6	5.7
70k+	75	92	3.7	5.2
Region				
British Columbia	77	93	3.7	5.7
Prairies	66	86	1.5	4.1
Ontario	68	88	2.7	5.0
Quebec	49	77	4.2	6.0
Atlantic	62	82	2.1	3.0
Employment				
Employed	68	87	4.2	7.6
Unemployed/NILF	56	82	2.7	3.9
Retired	63	83	0.5	0.6

Note: This table shows the percentage of respondents who were aware of Bitcoin (answered "Yes" to "Have you heard of Bitcoin?") and the percentage of respondents who own Bitcoin (answered "Yes" to "Do you currently have or own Bitcoin?") in 2016 and 2017. Waves 1–2 of the BTCOS were in the field in November and December 2016; Wave 3 was in the field in December 2017. Results are broken down by demographic categories.

Table 2: **Knowledge questions**

	Non-owners				Owners			
	Per cent correct		Per cent attempt		Per cent correct		Per cent attempt	
	2016	*2017*	*2016*	*2017*	*2016*	*2017*	*2016*	*2017*
1. No third party	52	49	56	54	69	78	96	90
2. Total supply fixed	13	19	33	42	51	53	92	85
3. Recorded on public ledger	14	16	29	35	61	57	91	78
4a. Government backed - 1	50	-	59	-	37	-	75	-
4b. Government backed - 2	-	59	-	62	-	78	-	91
5a. Instantaneous	3	-	48	-	39	-	97	-
5b. Security relies on cryptography	-	3.5	-	43	-	13	-	80

	2016	*2017*	*2016*	*2017*
Average $score_1$	0.8	1.4	2.2	2.7
Average $score_2$	0.0	0.9	0.7	1.9

Note: This tables summarizes results from the true/false knowledge questions posed to all respondents who were aware of Bitcoin. There were two scores calculated for each respondent: $score_1$ is the sum of correct responses; $score_2$ is the number of correct responses minus the number of incorrect responses. The scores were calculated based on questions 1–4, given the poor performance by respondents in both versions of the fifth question. Note that respondents had the opportunity to answer "Don't know," and we report the percentage of respondents who attempted the question.

Table 3: **Main reason for ownership**

(a) Detailed

	2016		2017					
	Overall		Overall		Transactors		Non-transactors	
Main reason for owning Bitcoin	No.	%	No.	%	No.	%	No.	%
It is an investment	6	12	61	58	20	38	41	77
My friends own Bitcoin	-	-	14	12	8	11	6	13
I am interested in new technologies	17	29	13	8	7	9	6	6
I use it to buy goods and services on the internet in Canada/elsewhere	4	7	9	6	8	12	1	1
It is a cost saving technology	-	-	6	5	6	11	0	0
It allows me to make payments anonymously	4	7	3	3	3	6	0	0
I use it to buy goods and services in physical stores in Canada/elsewhere	8	14	1	1	1	3	0	0
I do not trust the government or the Canadian dollar	2	3	2	2	1	2	1	2
It uses secure blockchain technology to prevent loss and fraud	6	7	2	2	2	4	0	0
I do not trust banks	2	3	2	1	2	3	0	0
I use it to make remittances or other international payments	6	11	1	0	1	1	0	0
Other	3	7	3	2	2	2	1	1
Total	58	100	117	100	61	100	56	100

(b) Condensed

	2016	2017		
	Owners	Owners	Transactors	Non-transactors
	%	%	%	%
Payment related	39	10	22	1
Store-of-value (investment)	12	58	38	77
Trust/privacy related	13	6	11	2
Technology related	36	15	24	6
N	58	117	61	56

Note: The two tables above show the responses of Bitcoin owners when asked about their main reason for owning Bitcoin. Transactors are owners who use Bitcoin to make a payment or person-to-person transfer at least once a year. The detailed table shows all the potential response options that Bitcoin owners could choose from; the condensed table collapses these reasons into relevant categories.

A Appendix

A.1 2017 BTCOS updated survey instrument

1. Have you heard of Bitcoin?
Yes No
[IF YES TO Q1, ASK Q1b, ELSE SKIP TO Q12]
1b. True/False knowledge questions.

2. Do you currently have or own any Bitcoin?
Yes No

[IF YES TO Q2, ASK Q3a and Q3b, ELSE SKIP TO Q4a]
3a. Please tell us your main reason for owning Bitcoin.
(Select one)
[RANDOMIZE LIST]
I am interested in new technologies
It is an investment
I use it to buy goods and services on the internet in Canada/elsewhere
I use it to buy goods and services in physical stores in Canada/elsewhere
It allows me to make payments anonymously
I use it to make remittances or other international payments
It uses secure blockchain technology to prevent loss and fraud
I do not trust banks
I do not trust the government or the Canadian dollar
My friends own Bitcoin
It is a cost saving technology
[ANCHOR] Other (specify)

3b. How many Bitcoin do you own?
(Select one)
None, Less than 0.05, 0.05 to 1, 1.01 to 5,
5.01 to 10, More than 10, Unsure/would rather not say

[IF NO TO Q2, ASK Q4a and Q4b, ELSE SKIP TO Q5]
4a. Have you owned or used Bitcoin in the past, but subsequently stopped using it?
Yes, No

4b. Please tell us your main reason for not owning any Bitcoin.
[RANDOMIZE LIST]
I do not understand/know enough about the technology
It is not widely accepted as a method of payment
My current payment methods meet all my needs
The value of Bitcoin varies too much
It is not easy to acquire/use
I do not trust a private currency that is not backed by the central government
I am concerned about cyber theft
I am concerned about lack of oversight from regulatory bodies
I use alternative digital currencies instead (e.g. Dogecoin, Litecoin, Ripple,etc)
I do not believe the Bitcoin system will survive in the future
[ANCHOR] Other (specify)

[ASK Q5 IF YES TO Q2, ELSE SKIP TO INSTRUCTIONS ABOVE Q6a]
5. How concerned are you about malicious attacks to the Bitcoin system
(e.g. miners forking the public ledger, cyber-attacks by hackers, etc)?
Please use a scale of 1 to 5 where 1 is very concerned,
and 5 is not at all concerned.

[ASK Q6a IF YES TO Q1]
6a. How likely do you think it is that the Bitcoin system will fail
or survive in the next 15 years?
Please use the sliding scale where 0 means that the system
will certainly fail and 100 means the system will certainly survive.
[INSERT SLIDING SCALE WITH WORD ANCHORS]

6b. What percentage of Canadians do you predict will be
using Bitcoin 15 years from now?
Please use the sliding scale where 0 means no Canadians will be
using Bitcoin and 100 means all Canadians will be using Bitcoin.
[INSERT SLIDING SCALE WITH WORD ANCHORS]

[ASK Q7a IF Q2=YES, ELSE SKIP TO Q12]
7a. What is the current price of Bitcoin?
Please provide your best estimate in Canadian dollars.
Please round to the nearest dollar.

[INSERT NUMERIC BOX]
1 BTC = $ _____ CAD

7b. The current price of one Bitcoin is around $22,107 Canadian,
as of the morning of December 11.
What do you expect the price of Bitcoin to be in one month?
Please provide your best estimate in Canadian dollars.
Please round to the nearest dollar.
[INSERT NUMERIC BOX]
1 BTC = $_____ CAD

8. Do you hold any of the following other digital currencies?
(Please check all that apply) [RANDOMIZE LIST]
Ethereum
Bitcoin Cash
Ethereum Classic
Litecoin
Dash
Ripple
[ANCHOR] Other (please specify) [PROVIDE TEXT BOX FOR RESPONSE] [DO NOT CODE]

9. Approximately how often do you use Bitcoin to pay for goods and services?
(Please select the most appropriate response)
Once a week or more
A few times a month
Once a month
A few times a year
Once a year
I have used Bitcoin to pay for goods and services once or twice,
but not on a regular basis
I have never used Bitcoin to pay for a good/service

10. Approximately how often do you use Bitcoin to send money to other people?
(Please select the most appropriate response)
Once a week or more
A few times a month
Once a month

```
A few times a year
Once a year
I have used Bitcoin to send money to other people once or twice,
     but not on a regular basis
I have never used Bitcoin to send money to other people

11. How many people do you know who currently own Bitcoin?
Please include:
- family members, friends, acquaintances and even those individuals you
 may have communicated with anonymously via social media or other channels
- only people who currently live in Canada and are 18 years of age or older
__________ # of people

[ASK ALL]
12. Thinking now about regular Canadian currency, how much cash do you
currently have in your purse, wallet, or pockets?
$_______________
```

A.2 Estimates of total Bitcoin holdings in Canada

Given each individual i's Bitcoin holdings h_i, we can estimate the total amount of Bitcoin, $\hat{H}$, owned by Canadians:

$$\hat{H} = \sum_i w_i h_i \tag{1}$$

where w_i are survey weights. The BTCOS asked respondents to report their Bitcoin holdings in ranges, so the best we can do is approximate h_i. To do so, we take the lower bound of each interval. We use the lower bound since the distribution of Bitcoin holdings is right-skewed and we do not want to introduce bias into the results. For example, the interval "0.05 to 0.1" would be estimated as $h = 0.05$. Some Bitcoin owners did not report the amount of Bitcoin they own, so multiple imputation is used when computing estimates and standard errors. See Table 4 for all results.

In 2017, we estimate that there were 1.9 million BTC held by Canadians. This marks an increase over 2016, where it was found that Canadians owned a total of 1.0 million BTC, but this difference was not statistically significant due to the large standard errors. Given

estimates of the total supply of Bitcoin in circulation,[10] we can also compute the share of all Bitcoin owned by Canadians. It was found that 11 per cent of all Bitcoin was owned by Canadians in 2017, compared with 6 per cent in 2016.

It is important to note that the above results should be viewed as an approximation. First, our methods are imprecise in measuring a person's Bitcoin holdings. Second, and related, standard errors are quite large, resulting in a large range of feasible values. In particular, the 95 per cent confidence interval for the share of Canadian Bitcoin in 2017 ranges from 5.7 to 16.8. Finally, using multiple imputation requires the assumption that missing values are missing "at random."

Further, there are reasons to suspect that we are specifically *over*estimating total Bitcoin holdings in Canada. As the BTCOS was conducted online, there may be a mode effect since respondents to the survey are required to have Internet access in some form, and therefore may be more likely to own Bitcoin than other Canadians. Chen, Dunbar and Shen (2017) discuss the difference in outcomes for offline versus online and provide a direction for the source of the difference; i.e., "*there is statistically significant evidence of mode effects in recall and subjective questions, but not for factual ones.*"

Finally, demographic factors associated with Bitcoin ownership are known to also be associated with inflated reporting of wealth on surveys. For example, Haberman and Elinson (1967) and Zagorsky (2003) both find that husbands report higher household income and wealth compared with their wives; Bottazi and Lusardi (2018) find that gender differences are associated with financial literacy, and that men were more likely to respond confidently even though they don't know something while women answer "don't know." This result may explain why a higher number of men (27) report high amounts of Bitcoin (see Table 5). This suggests that their self-reported holdings may contribute to an overestimate of the total. Further work is required to calibrate survey estimates of Bitcoin holdings to relevant network data, such as Canadian Bitcoin exchanges, or the blockchain itself.

Table 4: Estimates of total Bitcoin ownership in Canada

	Wave 1/2 (2016)	**Wave 3 (2017)**
Total	1,015,184 *(295,606)*	1,891,181 *(466,708)*
Share	6.31% *(1.84)*	11.28% *(2.78)*

Note: This table provides estimates of the total amount of Bitcoin owned in Canada, and the share of all Bitcoin owned by Canadians. These estimates are calculated using post-stratification weights and multiple imputation of Bitcoin holdings. Standard errors are in parentheses. Share of Bitcoin owned is calculated as the total Bitcoin owned by Canadians divided by the total amount of Bitcoin in the world (16.1 million as of December 31, 2016 and 16.8 million as of December 31, 2017 (source: blockchain.info)).

[10] 16.1 million as of December 31, 2016 and 16.8 million as of December 31, 2017 (source: blockchain.info).

Table 5: High Bitcoin holdings by key demographics

Demographic	No.	%
Gender		
Male	27	73
Female	10	27
Education		
H.S.	4	11
College	8	22
University	25	68
Income		
<30k	1	3
30–69k	13	36
70k+	22	61
Age		
18–34	20	54
35+	17	46

Note: This table shows the number of respondents holding more than 1 BTC, by demographics. High holdings among certain demographics—for example, males—can lead to an overestimate of the total holdings in Canada.